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(71) Applicant: N.V. Philips' Gloeilampenfabrieken
Groenewoudseweg 1
NL-5621 BA Eindhoven(NL)

(72) Inventor: Frôling, Melchert Hendrik
c/o INT. OCTROOIBUREAU B.V. Prof. Holstlaan B.V.
NL-5656 AA Eindhoven(NL)

(72) Inventor: Schmitz, Herman Jan Renier
c/o INT. OCTROOIBUREAU B.V. Prof. Holstlaan B.V.
NL-5656 AA Eindhoven(NL)

(74) Representative: Kooiman, Josephus Johannes
Antonius et al,
INTERNATIONAAL OCTROOIBUREAU B.V. Prof.
Holstlaan 6
NL-5656 AA Eindhoven(NL)

(54) Television receiver comprising a teletext decoding circuit and a page number memory.

(57) A television receiver which is suitable for displaying teletext pages comprises a control system including a microcomputer. This microcomputer is coupled to a volatile memory which comprises a plurality of page number registers. A page number can be stored temporarily in each of these registers. With the aid of a keyboard the user makes known which page numbers he wants to have stored in the different registers and the stored page numbers represent a first series of pages.

One single read key (RCL) is provided for the display of such a page. Each time this key is depressed once, a different page belonging to the first series appears on the picture screen. The sequence in which the pages appear is the same as the sequence in which the user has keyed-in the relevant page numbers. This sequence can be interrupted by the occurrence of a preselected operating instruction in response to which a number of teletext pages not associated with said first series can be displayed on the picture screen. Thereafter, the display of the teletext pages of the first series can be continued.

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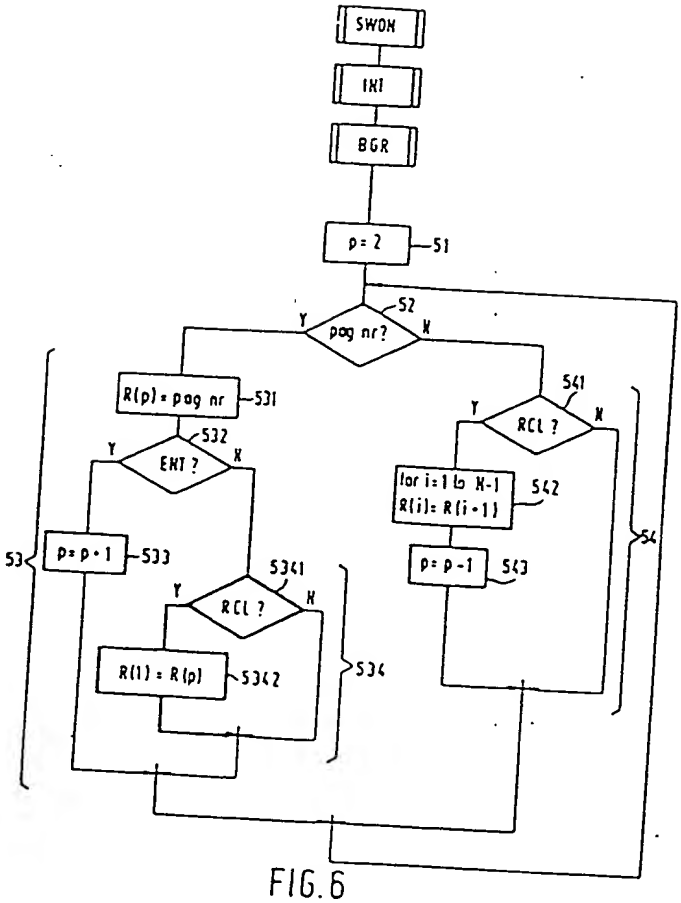
SWON
INI
BGR
p = 2
51
52
pag nr?
Y
N
R(p) = pag nr
531
532
ENT ?
Y
N
p = p + 1
533
53
5341
RCL ?
Y
N
R(1) = R(p)
5342
534
541
RCL ?
Y
N
for i = 1 to N-1
R(i) = R(i+1)
542
p = p - 1
543
54

FIG.6

"Television receiver comprising a teletext decoding circuit and a page number memory."

A. Background of the invention.

A(1) Field of the invention.

The invention relates to a television receiver of a type comprising a teletext decoder circuit and a storage means (page number memory) in which the page numbers associated with a plurality of teltext pages can be stored.

A(2) Description of the prior art.

Such a television receiver has (several operating mode, more specifically) at least a program mode and a teletext mode. In the program mode, the video signal transmitted by a transmitter is applied through a video channel to a picture screen for displaying the television program. In the teletext mode said video signal is applied via a teletext decoder circuit to the picture screen for displaying the teletext multiplexed with the program: The television program can be partly or wholly suppressed.

The operating mode is determined by the viewer, (user). To enable the viewer to inform the receiver about his wishes, the receiver comprises a control system comprising external components which can be manipulated by the viewer. More specifically, this control system has a control panel with control keys, each having a specific control function. The function is indicated by a sign applied on, over, or under the relevant control key. Thus, there are for example a volume control key a luminance key, a teletext key, a mixed-mode key, a program key and a plurality of figure keys, etc. These last-mentioned keys are characterized in that the associated signs are figures. If the receiver is in the program mode, the viewer can inform the receiver with the aid of the figure keys which program or channel is wanted. After the teletext or the mixed-mode key has been operated the set is in the teletext

mode with a partly or wholly suppressed television program and the viewer keys-in the page number of the desired teletext page, using the same above-mentioned figure keys.

Operation (or manipulation) of one or more of the keys on the control panel generally results in the generation of a control instruction by the control system. Such control instruction may include the page numbers of desired teletext pages. All these instructions are received by a control circuit which interprets these instructions and gives instructions to the different circuits, inter alia the teletext decoder circuit to be controlled. More specifically, the teletext decoder circuit receives a page number in response to which the required teletext page is captured, stored in a page memory and thereafter displayed on the picture screen.

As is known, a teletext index page is first displayed on the picture screen after a teletext key or the mixed-mode key has been operated. By selecting a desired page from this index and keying-in the associated page number with the aid of the figure keys, this teletext page is captured by the teletext decoder circuit and displayed thereafter.

If thereafter the display is required of a page associated with a different subject, the index page must usually again be consulted to find the page number of the relevant page. It should be borne in mind that each time the page number of a desired page is keyed-in it takes a certain period of time before the relevant page is displayed on the screen; it is therefore justified to state that such a television receiver is far from user-friendly. To improve this, it is proposed on page 527 of reference 1 to provide the receiver with a storage means which is coupled to the control circuit and in which a plurality of page numbers can be stored. This storage means will be referred to as the page number memory hereinafter.

By operating the control circuit, the user can store a first series of page numbers in a sequence in

which he wants their pages to be displayed, in the page number memory. To enable the display in the desired sequence of these preselected teletext pages, the control panel comprises a key which will be called the read key hereinafter. Each time this key is operated, the control circuit receives an accurately defined operating instruction and a subsequent page number of the first series is read from the page number memory and applied to the teletext decoder circuit. In this way the teletext pages of the first series are sequentially displayed on the picture screen.

Thus, for this television receiver it is possible to select from an index page all those pages the viewer is interested in. The corresponding page numbers can be stored in the page number memory in the sequence in which the display of these pages is desired. Thereafter, they can be caused to appear in the desired sequence, one after the other, by pushing the read key once for every page.

It should be noted, that, after the read key has been operated, it still takes a certain time before the new page appears on the picture screen. However, by constructing the teletext decoder circuit in the way described in Reference 1 or 2, a new page can be displayed immediately after pushing the read key. More specifically it is namely possible to couple to the teletext decoder circuit detailed in said references a page memory having such a capacity that no less than four pages can be stored therein simultaneously. It is organised that this page memory contains the page actually displayed on the picture screen and also the three subsequent pages of the first series.

It should also be noted that the page number memory may be constituted by a non-volatile memory, so that the same series of teletext pages are permanently available. It is alternatively possible to use a volatile memory for this purpose, optionally in combination with a non-volatile page number memory.

B. Object and summary of the invention.

The invention has for its object to further im-

prove the comfort of use of a television receiver of the type defined in the foregoing, comprising a volatile page number memory. According to the invention, the control circuit is further arranged for performing the following steps:

- interrupting the sequential display of the teletext pages of the first series for the benefit of the sequential display of a number of further teletext pages which do not belong to the first series, whose associated page numbers are generated by means of the control system;
- continuing the display of the teletext pages of the first series in response to a further operation of the read key, after all the further teletext pages have been displayed on the screen.

The properties of the television receiver thus obtained will no doubt to be appreciated when the following is considered. The contents of the first series of pages whose page numbers are stored in the page number memory are not known previously. When those pages are displayed, it may happen that a given page is itself an index page (denoted a sub-index page)or that it contains a reference to pages in which additional information on the same subject is contained. The viewer can now select from such a sub-index page a further series of pages, generate the associated page numbers with the aid of the control system and insert the display of these pages between the sub-index page and the next page of the first series. If the control circuit were not implemented in such a way that the above-defined steps can be performed, then these further pages could not be displayed until all the pages of the first series have been displayed on the picture screen.

C. References.

1. Enhanced UK teletext moves towards still pictures; J.P.Chambers: IEEE Transactions on Consumer Electronics, Vol. CE-26, August 1980, pages 527-532.

2. Computer controlled teletext; J.R.Kinghorn; Electronic Components and Applications, Vol. 6, No. 1, 1984, pages 15-29.

3. Bipolar IC's for video equipment; Philips Data Handbook Integrated Circuits Part 2, January 1983.
4. IC's for digital systems in radio, audio and video equipment; Philips Data Handbook Integrated Circuits, Part 3, September 1982.

D. Short description of the Figures:

Fig. 1 shows the general structure of a television receiver comprising a teletext decoder circuit and

Figs. 2 to 10 show diagrams to explain the operation of this television receiver.

E. Description of embodiments:

E(1) General structure of the television receiver.

Fig. 1 shows schematically the general structure of a colour television receiver. It has an aerial input 1, connected to an aerial 2, which receives a video signal modulated on a high-frequency carrier and processed in a plurality of processing circuits. More specifically, the video signal is applied to a tuning circuit 3 (tuner or channel selector). This tuning circuit receives a band selection voltage V_B to enable tuning of thereceiver to a frequency within one of the frequency bands VHF1, VHF2, UHF etc. In addition, the tuning circuit receives a tuning voltage V_T for tuning the receiver to the desired frequency within the selected frequency band.

This tuning circuit 3 produces an oscillator signal having frequency f_{OSC} and also an intermediate-frequency signal IF. The last-mentioned signal is applied to an intermediate-frequency amplifying and demodulating circuit 4 which produces a base band composite video signal CVBS. For this circuit 4, reference could be made to Philips IC TDA 2540, described in Reference 3.

The signal CVBS thus obtained is applied to a colour decoder circuit 5, which produces the three primary colour signals R, G and B, which are applied *via* an amplifier circuit 6 to a picture tube 7 for displaying television programs on the picture screen 8. In the colour decoder circuit 5, *inter alia* colour saturation, contrast and luminance are influenced by means of control signals.

In addition, the colour decoder circuit receives an additional set of primary colour signals R', G' and B', and also a switching signal BLK (Blanking) with which the primary colour signal R, G and B can be suppressed. For this circuit 5, a Philips integrated circuit of the group TDA 356 X, which is also described in Reference 3, can be used.

The video signal CVBS is also applied to a teletext decoder circuit 9, which comprises a video input processor 9(1) receiving the video signal CVBS, separating the teletext data therefrom and applying the latter via a data line TTD to a circuit 9(2) which will be called the computer-controlled teletext decoder (abbreviated to CCT-decoder). This CCT-decoder also receives a clock signal from the video input processor 9(1) via a clock line TTC. The decoder is further coupled to a memory 9(3) in which one or more teletext pages can be stored and which is therefore called the page memory. This CCT-decoder produces the three previously-mentioned primary signal R', G', B' and also the switching signal BLK. The video input processor 9(1) may be constituted by the Philips IC SAA 5230, the CCT-decoder 9(2) by the Philips IC SAA 5240 and the page memory by a 1K8 to 8K8 RAM. For a detailed description of the structure and operation of a teletext decoder circuit reference is made, for the sake of brevity, to Reference 2.

The CCT-decoder 9(2) is further connected to a bus system 10, to which also a control circuit 11, in the form of a microcomputer, an interface circuit 12, a non-volatile storage means 13 and a volatile storage means 14 are connected. The interface circuit 12 produces said band selection voltage V_B, the tuning voltage V_T and also the control signals for controlling the analog functions of contrast, luminance and colour saturation. It receives an oscillator signal having frequency f'_{OSC} which by means of a frequency divider 15 whose dividing factor is 256, is derived from the oscillator signal having frequency f_{OSC} supplied by the tuning circuit 3. Tuning circuit 3,

frequency divider 15 and interface circuit 12 together form a frequency synthesizing circuit. The Philips IC SAB 3035, which is known by the name CITAC (Computer Interface for Tuning and Analog Control) and is described in Reference 4 may be used as the interface circuit.

The storage means 13 is, for example, used to store the tuning data of a plurality of preselected transmitters, or programs. If under the control of the microcomputer 11 such a tuning datum is applied to the interface circuit 12, then it produces a given band selection voltage V_B and a given tuning voltage V_T, in response to which the receiver is tuned to the desired transmitter.

For the microcomputer the microcomputer of the Philips MAB 84XX family can be used. Although it may be assumed that the structure of a microcomputer is generally known, it should here be remarked briefly that it comprises a program memory (usually a ROM) in which the manufacturer stores a plurality of control programs, and also a working memory.

The volatile storage means 14 is used as a page number memory. It comprises a number of N page number-registers having the register numbers R(1), R(2), .. R(p) ... R(N), respectively, wheren N = 10. This volatile storage means 14 which is shown in the drawing as a separate memory, is preferably constituted by a portion of the working memory of the microcomputer 11.

To operate this television receiver a control system is provided which in the embodiment shown is in the form of a remote control system and is constituted by a handset 16 and a local receiver 17. This receiver 17 has an output which is connected to an input (usually the "interrupt"-input) of the microcomputer. The receiver may be the Philips IC TDB 2033 described in Reference 4 and then has for its object to receive infrared signals transmitted by the handset 16.

The handset 16 comprises a control panel 16(1) which, in addition to a number of figure keys indicated by the figures 0 to 9, has the following keys: a saturation

key SAT, a brightness key BRI, a volume control key VOL, a teletext key TXT, a mixed-mode key MIX, a program key PR, a storage key ENT and a read key RCL. The keys of this control panel are coupled to a transmitter circuit 16 (2) for which the Philips IC SAA 3004, which is described in detail in Reference 4, may, for example, be used. If a key is depressed, then the transmitter circuit 16(2) generates a code which is specific for that key and which is transmitted on an infrared carrier to the local receiver 17, is demodulated there and thereafter applied to the microcomputer 11. Thus, the microcomputer receives control instructions and via the bus system 10 energizes one of the circuits coupled thereto. It should be noted that a control instruction may be single, that is to say that it is complete after only one single key has been operated. It may alternatively be a multiple instruction, that is to say that it is not complete until two or more keys have been operated. This situation occurs, for example, when the receiver is in the teletext mode. In that case operating the figure keys does not produce a complete operating instruction until, for example, three figure keys have been depressed. Such an operating instruction, consisting of for example three figures, is called a page number.

E(2) Operation of the television receiver.

The operation of the television receiver shown in Figure 1 is wholly determined by the various control programs stored in the internal program memory of the microcomputer. A control program which is always stored in such a receiver, is the switch-on program SWON which is shown symbolically in Fig. 2. Although this program is generally known, it should be noted for the sake of completeness that this program immediately applies a predetermined tuning datum present in the storage means 13 to the circuit 12 after the receiver has been switched on, in response to which the receiver is tuned to the relevant transmitter. This may be a predetermined transmitter, but it may also be a transmitter the receiver was tuned to at the moment it was switched off.

After the switch-on program has beenperformed, the initiation program INT which is symbolically indicated in Fig. 3 is started. During this program the content of the first page number - register R(1) is made equal to a fixed page number; for example 100 (one hundred). This page number 100 is also applied to the CCT-decoder 9(2) which captures this page, stores it in the page memory 9 and displays it on the picture screen 8 after the teletext key TXT or the mixed-mode key MIX has been operated. To determine whether a key has been depressed, the so-called background program BGR, which is shown symbolically in Fig. 4 is started.

After the teletext key or the mixed-mode key has been operated, a teletext program is started which is given the reference numeral 50 in Fig. 5. This program includes a step 51 in which the value 2 is assigned to a vector e. Thereafter, in a step 52 it is checked whether a page number is received. If yes, then a storage program 53 is passed through; or, if no, a read program 54 is entered. After such a program has ended, it is checked in step 53 whether a new page number is received.

The storage program 53 includes a step 351 in which the page number received is stored in the register R(p). Thereafter, in a step 532 it is checked whether the storage key (enter key) ENT has been operated. If not, then this storage program has ended and the content of the register R(p) can be overwritten by a different page number. If the enter key has been operated, the vector p is first incremented by one in a step 533. Acting thus, the registers R(1) to R(N) can be loaded with page numbers of a first series of teletext pages. These pages can now be displayed sequentially on the picture screen by means of the read program upon operating the read key RCL. More specifically, the read program 54 has a step 541 in which it is checked whether the read key has been operated. If no the read program has ended; if yes, the contents of the registers are shifted in a step 542 to registers of the next lower number, that is to say the content of regis-

ter R(2) is shifted to R(1), the content of register R(3) is shifted to R(2) etc. Thereafter, the vector p is decremented by one unit in a step 543, so this vector p now indicates the empty register having the lowest number. If now a new page number were received and the storage key ENT were depressed, then this new page number would be stored in the register R(p-1). Before the associated teletext page can be displayed, the read key RCL must then first be depressed p-2 times. Pre-storing the page numbers of the desired teletext pages and the fact that only one key (namely the read key) must be operated to effect the display of these pages, makes this television receiver very user-friendly. However, the fact that a new page number cannot result in the immediate display of the associated page when all the page number registers are not empty (so that the vector p = 1) is experienced as annoying. To increase the convenience and comfort of use of this television receiver the storage program is provided, as is shown in Fig. 6, with an auxiliary read program 534 consisting of one step 5341 in which it is checked if after reception of a page number the read key RCL has been operated without the storage key ENThaving been depressed. If this is the case, then in a step 5342 the content of register R(p) is transferred to register R(1) and thus the relevant page is captured and displayed as soon as the opportunity is there.

With the program shown in Fig. 6 a subsequent new page number can be applied after the preceding new page number has been transferred from register R(p)to register R(1). A storage and read program with which the successive display of the teletext pages of the first series can be interrupted to enable the storage of a second series of page numbers in a sequence the user wants their to be displayed and the sequential display of the pages of this second series in response to the depression of the read key RCL, followed by the display of the original (first) series of pages, is illustrated in Fig. 7. This program differs from the program shown in Fig. 5 in that

now the read program 54 has, instead of the program step 543, a program step 543' in which the vector p is made equal to two. After each operation of the read key RCL and the register contents have been shifted one register in step 542, this vector becomes equal to two.

The storage program 53 further comprises a step 535 in which the contents of the register R(p) to R(N-1) are shifted to registers of a next higher number.

If, after the read key RCL has been depressed and the read program has been performed a new page number is applied to the microcomputer, then in step 535 the content of the second register R(2) is shifted to the third register R(3), the content of the third register R(3) is shifted to the fourth register R(4) etc. Thereafter, the new page number is stored in the second register R(2) in step 531. If thereafter the storage key ENT is operated, then the vector p becomes equal to 3. A new page number is then stored in the third register R(3), whilst the original content of the third, fourth, fifth, sixth, etc. registers are shifted to the fourth, fifth, sixth, seventh etc. registers, respectively. In this way, each of a second series of Q-1 page numbers can be stored in the registers R(2) to R(Q) each time the read key RCL is operated, the page numbers originally contained in these registers being shifted to registers of Q-1 higher numbers. When the read key is now operated, these Q-1 page numbers of the second series are first applied to the teletext decoding circuit to capture their respective pages for display and only thereafter the display of the pages of the original (first) series of page number is continued.

The program shown in Fig. 6, which provides the possibility of storing a new page number directly in the first register, and thus to display the associated page on the display screen at the first opportunity, can advantageously be combined with the program shown in Fig. 7. For the sake of completeness, Fig. 8 shows a program comprising both the program steps shown in Fig. 6 and those

shown in Fig. 7. To have this program proceed adequately, the steps 5343, 5344 are additionally present which, in view of the foregoing need no further explanation.

The teletext programs shown in Figs. 5, 6, 7 and 8 are structured such that storing a series of new page numbers requires the operation of the storage key ENT after a new page number has been applied. It is however alternatively possible to structure the teletext program such that the storage key must be operated before a new page number is applied. Such a teletext program is shown for the sake of completeness in Fig. 9. It comprises a step 51' in which the vector p is given the value one. To enable, in agreement with the program shown in Fig. 6, the immediate storage of any random page number in the register R(1), this program has a step 60 in which it is checked whether a page number is applied. If yes, this page number is immediately stored in the first register R(1) in step 61, whereafter early display of the relevant page can follow. If no page number is applied, then it is checked instep 62 whether the storage key ENT has been operated. If no, the read program 54 is effected: if yes, the storage program 63 is effected.

The read program again includes the steps 541 and 542. It now also has a step 543" in which the vector p is again made equal to one. The storage program 63 has a step 631 in which the actual value of the vector is incremented by one. Thereafter, in a step 632, the application of a new page number is awaited, whereafter in step 633 the contents of the registers R(p) to R(N-1), respectively are shifted to the registers R(p+1) to R(N). Finally, in step 634 the latest page number is stored in the register R(p).

The teletext programs mentioned in the foregoing have the property that those page number registers R(.) in which no page numbers selected by the user are stored remain empty. This implies that when the user repeatedly depresses the read key he may be confronted by the situation that all registers are empty. To prevent this situation

from occurring, these registers may be filled automatically with page numbers, for which there are two adequate possibilities. Firstly, they might be the page numbers of preferred pages which had previously already been stored by the user in a non-volatile memory, for example, the memory 13 in Fig. 1. Secondly, they might be the page numbers S+1, S+2, ... etc., S being the last page number of the first series. To accomplish that the page number registers are filled thus with page numbers, the teletext program might be of a structure as shown in Fig. 10. This program corresponds to a considerable extent to the program shown in Fig. 8, but differs therefrom in several respects. Step 51 is followed by a step 70 in which a page number and also a user flag flg(.) are stored in the registers R(2) to R(N) (see Fig. 1). More specifically, the page number in the register R(i) then becomes one higher than the page number in the preceding register R(i-1), so that at the end of this step 70 the page number registers R(1) to R(n) contain the respective page numbers 100, 101, 102, 103, ... 100 + (N-1). The associated user flags are all zero.

If at a given value of the vector p a new page number, for example S, is applied, then in step 71 it is first checked whether the user flag flg(p) in the register R(p) is equal to one. If no, this implies that the register R(p) is not filled with a page number explicitly stipulated by the user. In step 721 this newly applied page number S is then stored in this register R(p). At the same time the associated user flag flg(p) becomes 1 to indicate that this page number has been selected by the user. Thereafter a step 722 is performed which corresponds to step 70. More specifically, the page number S+1 is then stored in the register R(p+1), the page number S+2 in the register R(p+2) whilst the associated user flags flg(p+1), flg (p+2), etc. all become equal to zero, signifying that these page numbers were not explicitly stated by the user.

If upon performing the step 71, the user flag flg(p) in the register R(p) is equal to one, then in step

535 the contents of the registers R(p) to R(N-1) are shifted to the respective registers R(p+1) to R(N), so that in step 531' the latest page number can be stored in the register R(p), the associated user flag flg(p) then simultaneously becoming equal to one.

This teletext program further differs from the program shown in Fig. 8 in that the auxiliary read program 534 has a further step 5345 and the read program 54 has a further step 544 identical thereto. In these steps, each time after the last page number register R(n) has become empty because of the shift operation effected in the preceding step, a page number which is one higher than the page number stored in the last-but-one register R(N-1) is stored in this register R(N). At the same time the associated user flag flg(N) becomes equal to zero.

It should be noted that in the embodiment shown in Fig. 1 the control circuit is predominantly constituted by the microcomputer 11. In practice it has however been found advantageous to arrange between the microcomputer 11 and the CCT-decoder 9(2) a second microcomputer which only controls this CCT-decoder 9(2) and for that purpose comprises inter alia one of the teletext programs described in the foregoing.

CLAIMS

1. A television receiver comprising:
- a control system for generating by means of external manual operations control instructions including page numbers of teletext pages;
- a teletext-decoder circuit having an input for receiving page numbers of teletext pages to be displayed and a picture signal output;
- a picture screen coupled to the picture signal output of the teletext-decoder circuit for displaying a teletext page which is identified by its page number;
- a storage means for storing a plurality of page numbers;
- a control circuit coupled to the storage means, to the control system for receiving the operating instructions, and to said input of the teletext decoder circuit to apply page numbers thereto, the control circuit further being arranged for performing the following steps:

- storing in the storage means the page numbers stipulated by the user of a first series of preselected teletext pages in the desired display sequence of these teletext pages;

- the sequential display of the teletext pages of the first series in response to each occurrence of a selected operating instruction;

- interrupting the sequential display of the teletext pages of the first series in response to the occurrence of a selected further operating instruction for the benefit of the sequential display of a number of further teletext pages which do not belong to the first series whose associated page numbers have been generated by means of the control system;

- continuing the display of the teletext pages of the first series after all the further teletext pages have been displayed on the picture screen.

2. A television receiver as claimed in Claim 1 in which the step of interrupting the sequential display of the teletext pages of the first series for the benefit of displaying a number of further teletext pages not associated with said series, comprises the following sub-steps:

- storing the page numbers of said number of further teletext pages in the storage means in a desired display sequence of these teletext pages;
- the sequential display of these teletext pages in response to each occurrence of the selected operating instruction.

3. A television receiver as claimed in Claim 1 or 2, in which the storage means comprises N registers, each arranged for storing a page number, a register in which a page number selected by the user is stored being occupied and the remaining registers not being occupied by page number selected by the user and in which the control circuit is further arranged for:

- not occupying a register in response to each occurrence of the selected operating instruction;
- generating a sequence of page numbers S+1, S+2, S+3, ..., in which S represents the last page number of the first sequence;
- storing the page numbers S+1, S+2, ... S+(N-M) in the respective non-occupied registers, where M is the actual number of occupied registers.

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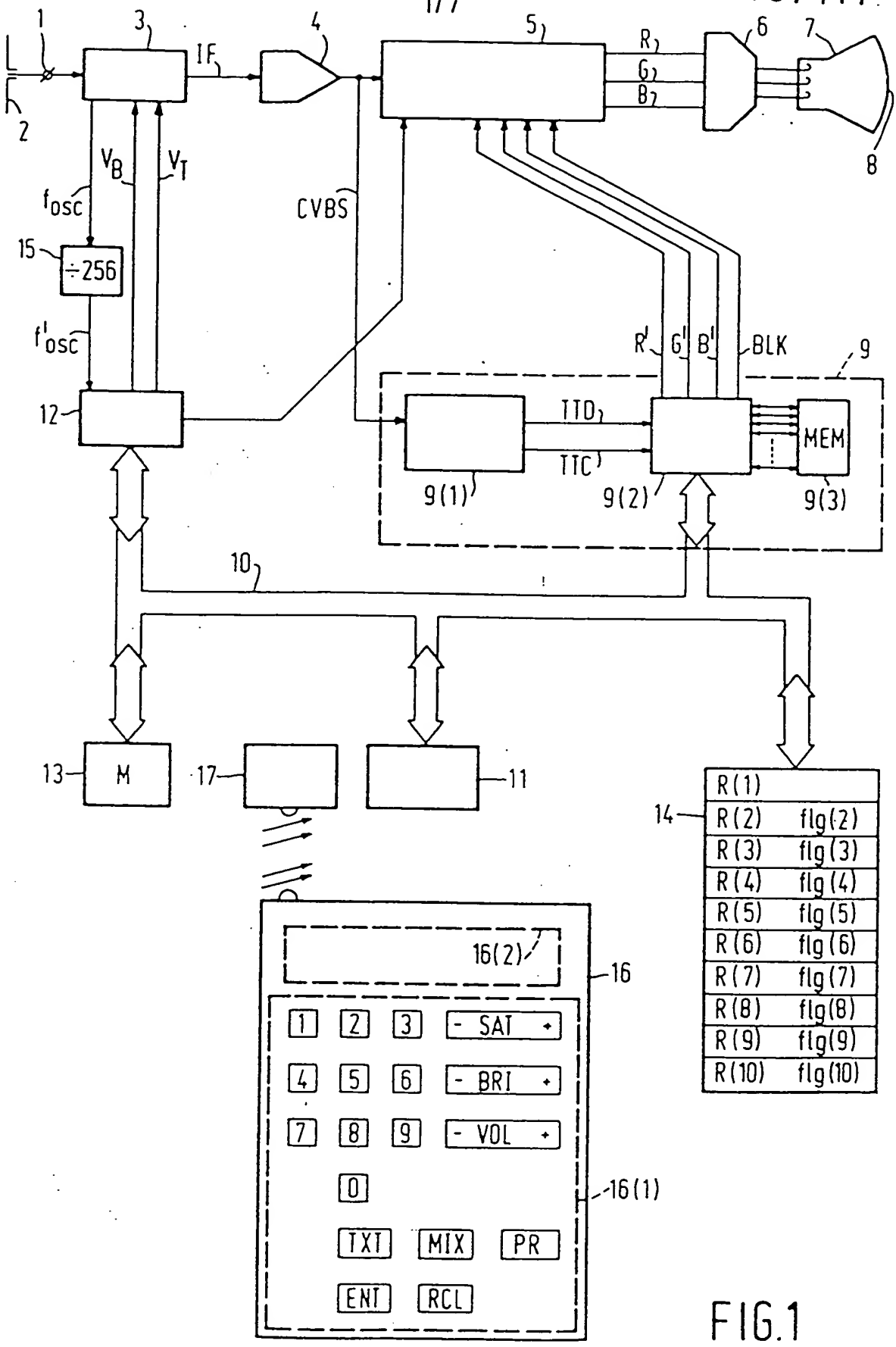

FIG.1

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FIG.2

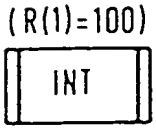


FIG.3

FIG.4

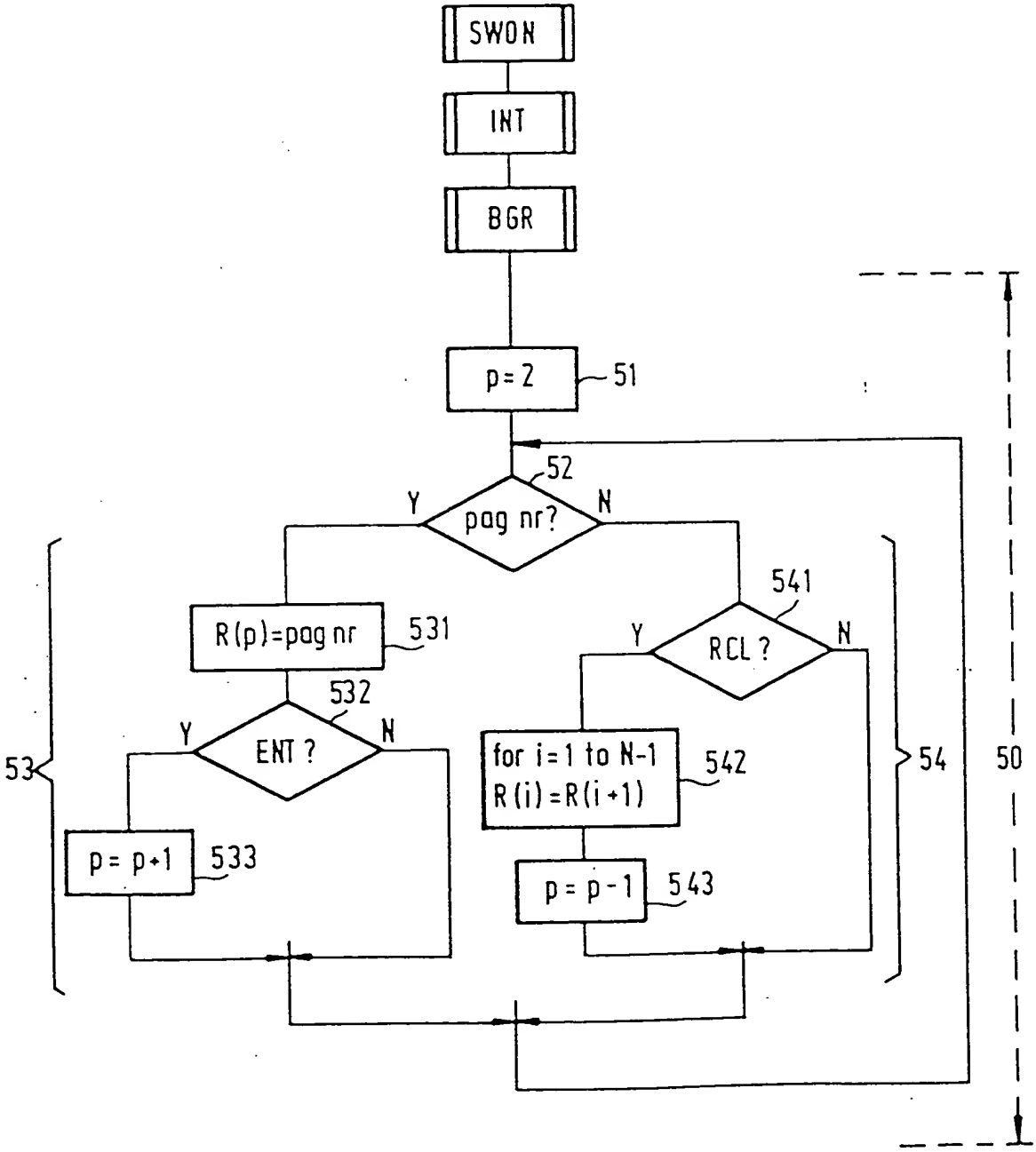
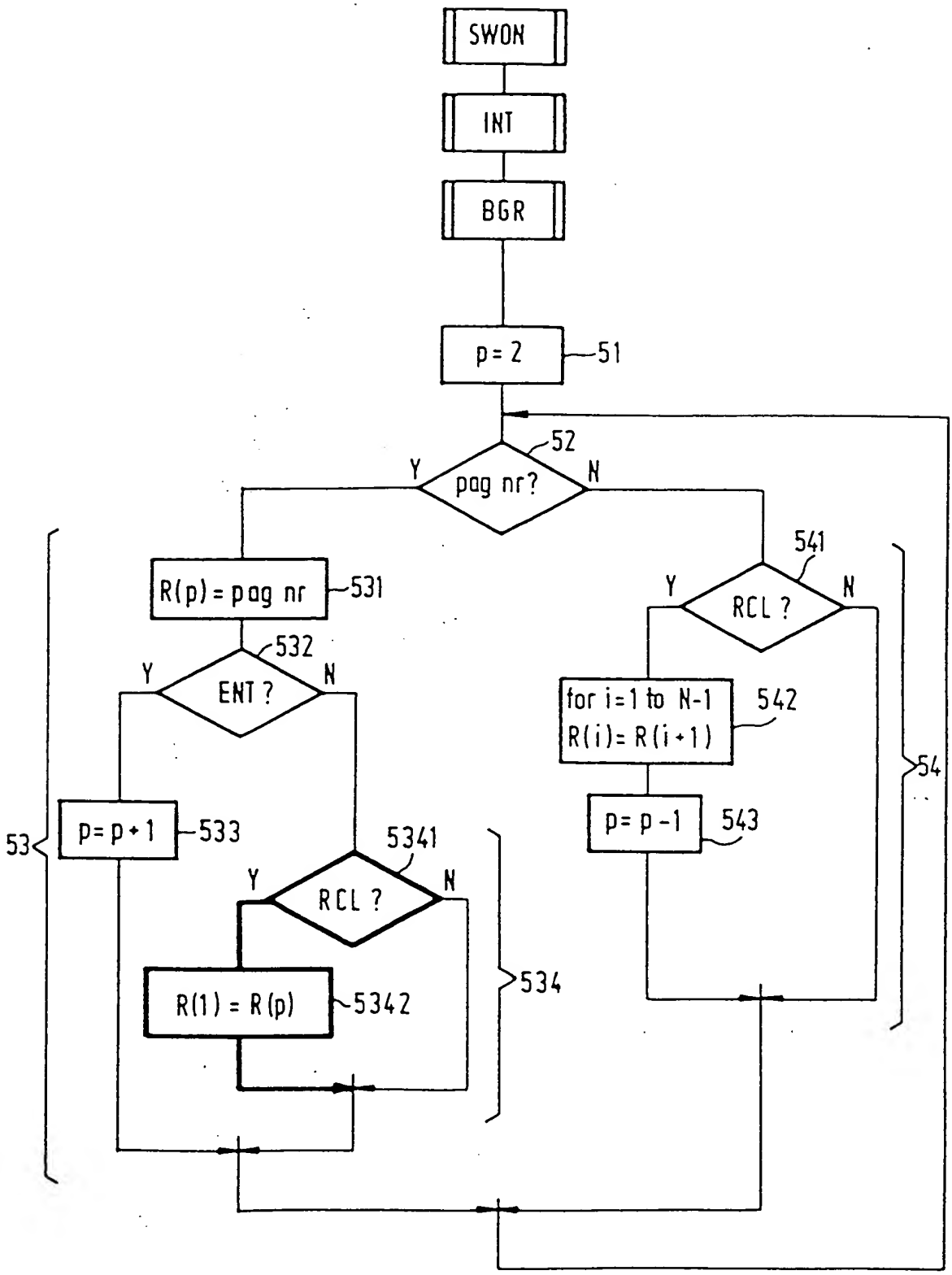


FIG.5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51
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pag nr?
Y
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R(p) = pag nr
531
532
ENT ?
Y
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533
5341
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5342
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Y
N
for i=1 to N-1
R(i)= R(i+1)
542
p= p-1
543
54

FIG.6

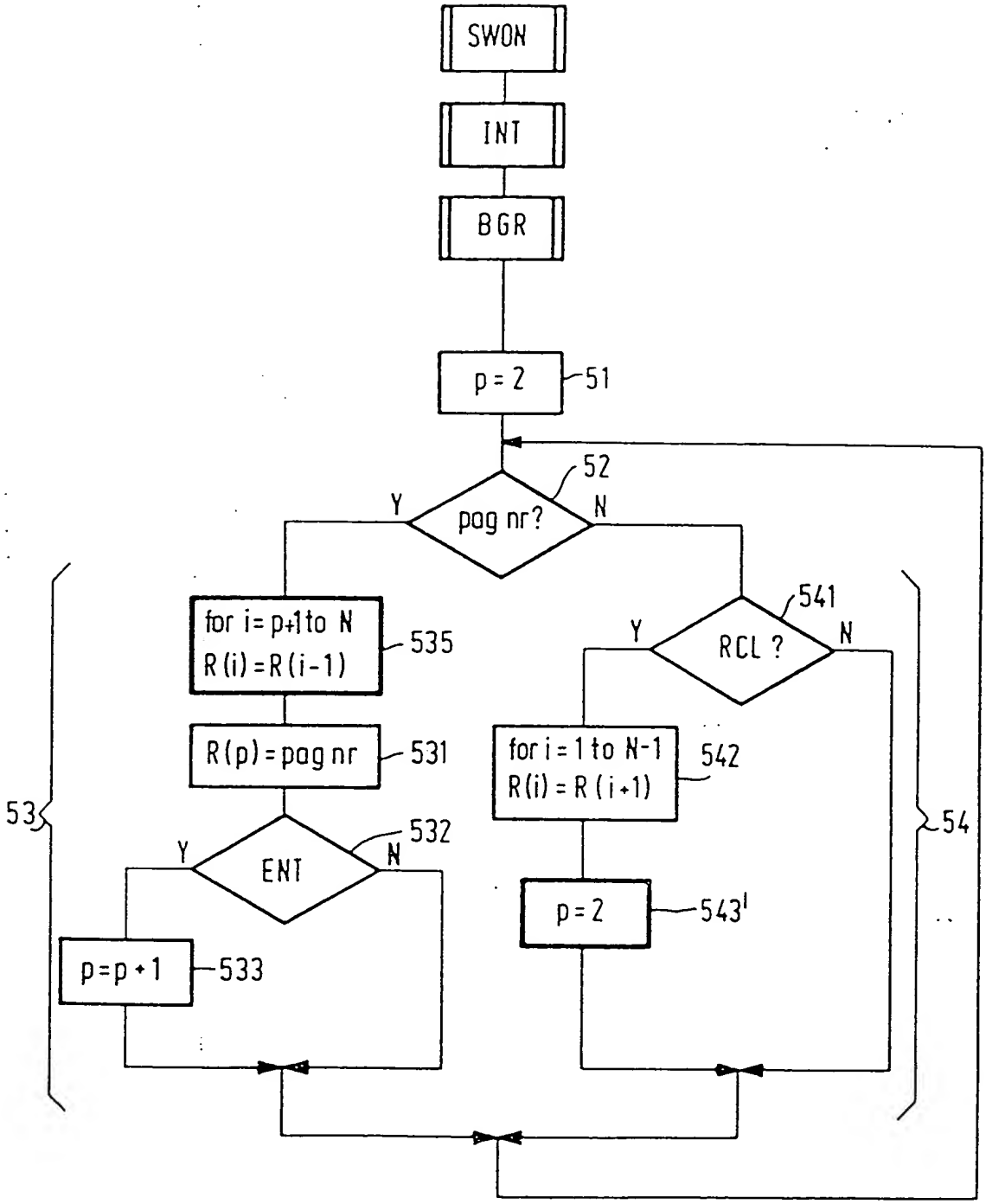
SWON
INT
BGR
p = 2
51
52
pag nr?
Y
N
for i = p+1 to N
R(i) = R(i-1)
535
R(p) = pag nr
531
ENT
532
p = p + 1
533
53
541
RCL ?
for i = 1 to N-1
R(i) = R(i+1)
542
p = 2
543'
54

FIG.7

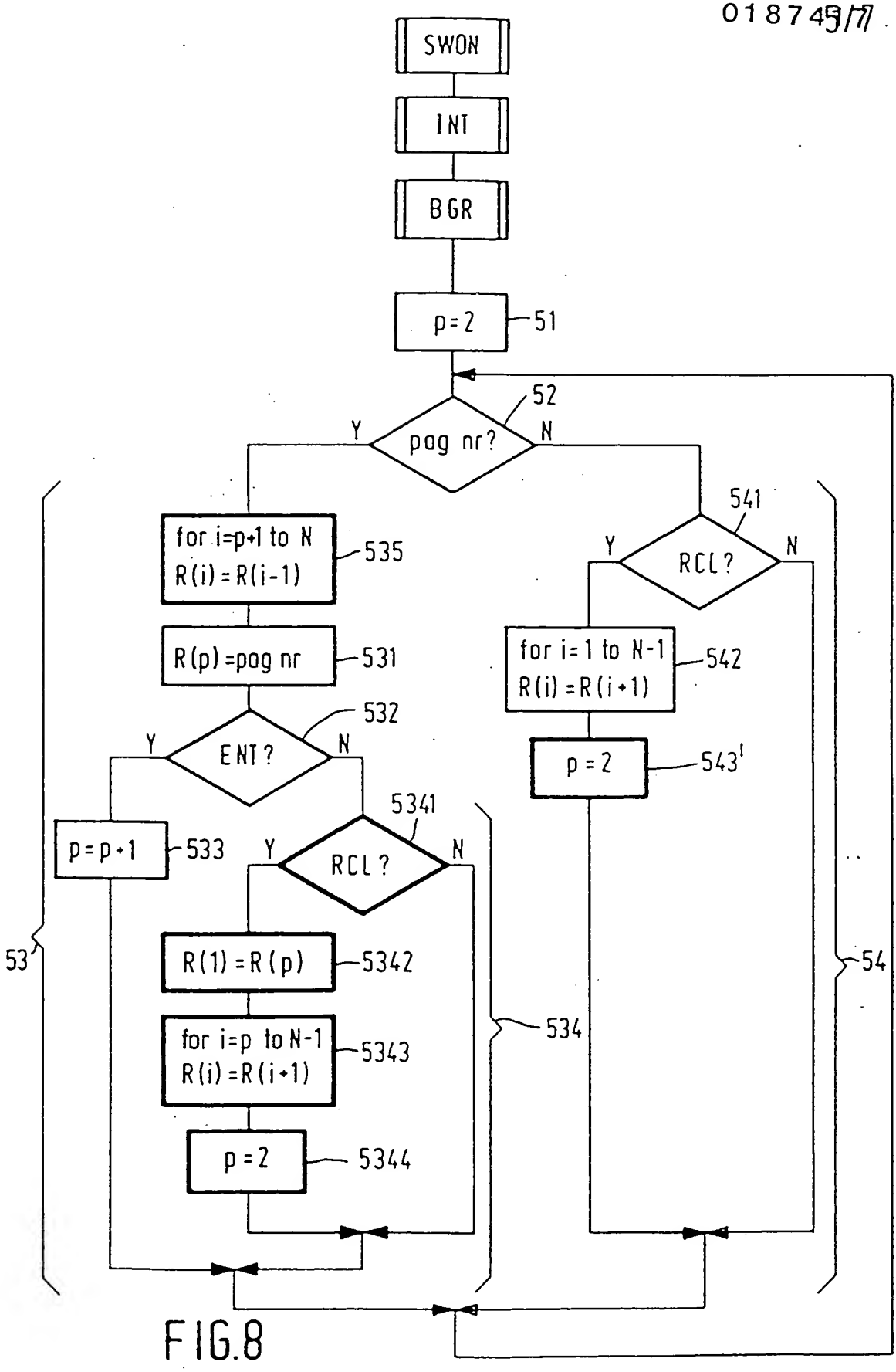
SWON
INT
BGR
p=2
51
52
Y
pag nr?
N
for i=p+1 to N
R(i)=R(i-1)
535
R(p)=pag nr
531
532
Y
ENT?
N
p=p+1
533
5341
Y
RCL?
N
R(1)=R(p)
5342
for i=p to N-1
R(i)=R(i+1)
5343
p=2
5344
534
53
541
Y
RCL?
N
for i=1 to N-1
R(i)=R(i+1)
542
p=2
543'
54

FIG.8

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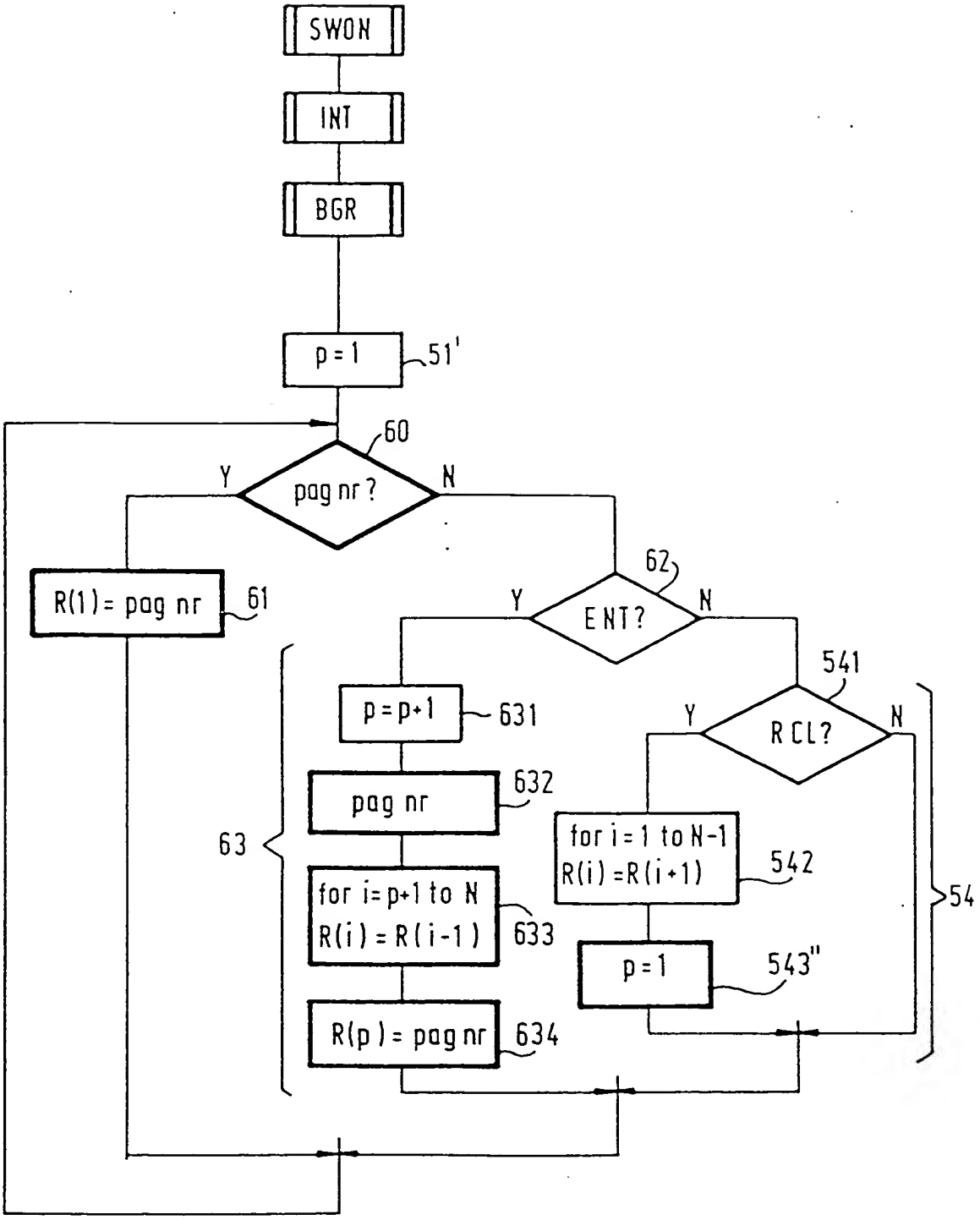

FIG. 9

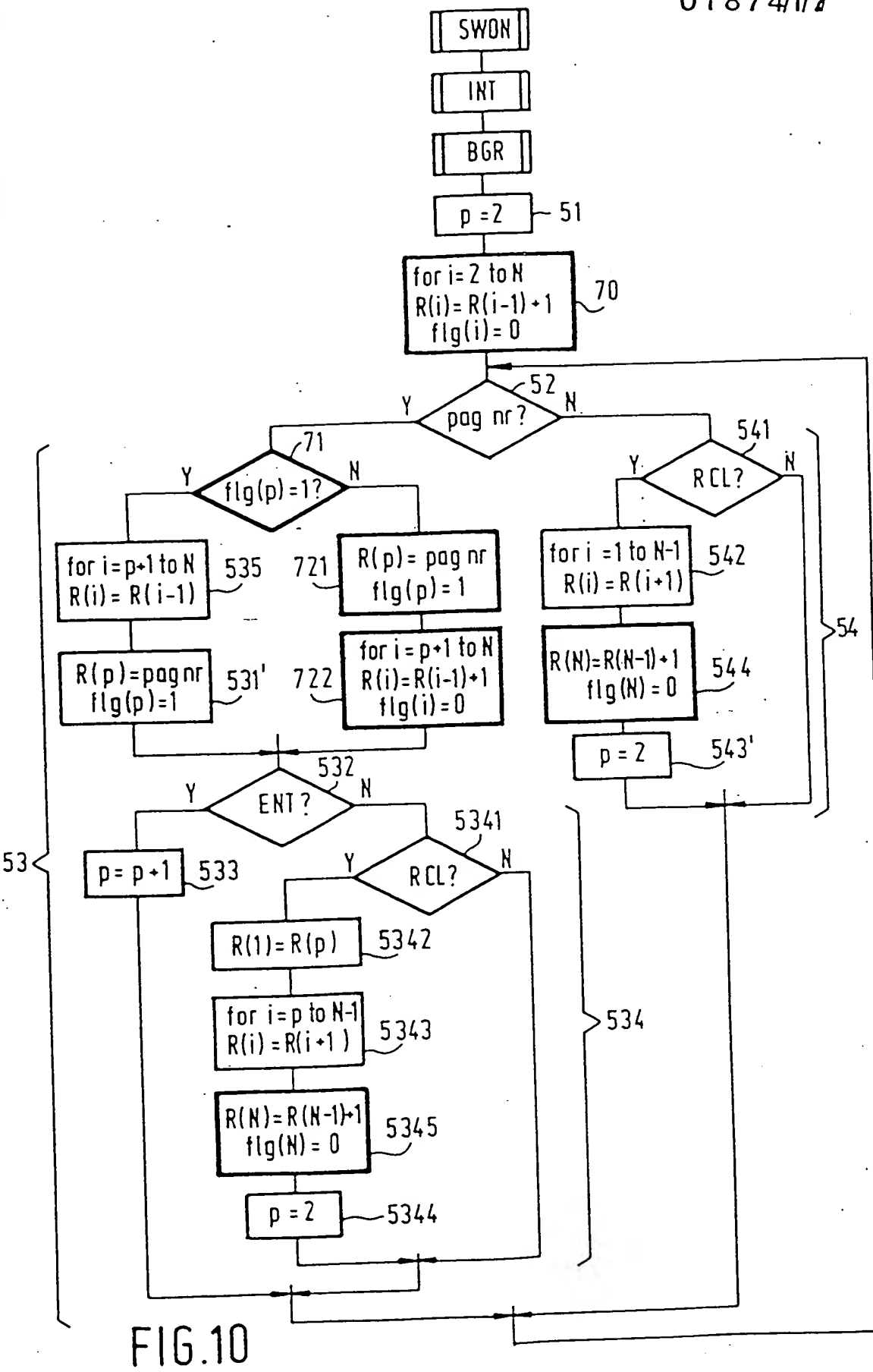
SWON
INT
BGR
p = 2
51
for i = 2 to N
R(i) = R(i-1) + 1
flg(i) = 0
70
52
pag nr ?
Y
N
71
flg(p) = 1?
Y
N
for i = p+1 to N
R(i) = R(i-1)
535
R(p) = pag nr
flg(p) = 1
721
R(p) = pag nr
flg(p) = 1
531'
for i = p+1 to N
R(i) = R(i-1) + 1
flg(i) = 0
722
532
ENT ?
Y
N
53
p = p + 1
533
5341
RCL ?
Y
N
R(1) = R(p)
5342
for i = p to N-1
R(i) = R(i+1)
5343
R(N) = R(N-1) + 1
flg(N) = 0
5345
p = 2
5344
534
541
RCL ?
Y
N
for i = 1 to N-1
R(i) = R(i+1)
542
R(N) = R(N-1) + 1
flg(N) = 0
544
p = 2
543'
54

FIG.10

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0187417
Application number

EP 85 20 2060

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	PROCEEDINGS OF THE IEE, vol. 126, no. 12, December 1979, pages 1374-1396, Stevenage, Herts., GB; D.J. BEAKHUST et al.: "Teletext and viewdata - a comprehensive component solution" * Page 1381, right-hand column, line 6 - page 1385, right-hand column, line 9 *	1	H 04 N 7/087 H 03 J 9/06
A	GRUNDIG TECHNISCHE INFORMATIONEN, vol. 27, no. 4/5, 1980, pages 171-196, Fürth, DE; P. HEIDER et al.: "Videotext und Bildschirmtext. Zwei neue Kommunikationsmedien. Grundlagen und Realisierung mit GRUNDIG-Geräten" * Page 181, left-hand column, line 32 - page 182, middle-column, line 59 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4) H 04 N H 03 J
A	EP-A-0 068 422 (INDESIT INDUSTRIA ELETTRO DOMESTICA ITALIANA) * Page 4, lines 1-18; page 9, line 6 - page 10, line 3; page 38, line 1 - page 50, line 23 *	1	
A	EP-A-0 037 077 (SIEMENS AG) * Page 9, line 9 - page 11, line 22 *	1	

-/-

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-04-1986	VERSCHELDEN J.

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Application number

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-4 337 485 (CHAMBERS) * Column 2, line 60 - column 4, line 48 *	1	
A	PATENTS ABSTRACTS OF JAPAN, vol. 7, no. 115, 19th May 1983, page 76 E 176; & JP - A - 58 34 690 (TOKYO SHIBAURA DENKI K.K.) 01-03-1983 * Abstract *	1	
A	PATENTS ABSTRACTS OF JAPAN, vol. 6, no. 144, 3rd August 1982, page 37 E 122; & JP - A - 57 65 981 (MATSUSHITA DENKI SANGYO K.K.) 21-04-1982 * Abstract *	1	
A	IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, vol. CE-26, no. 3, August 1980, pages 527-552, IEEE, New York, US; J.P. CHAMBERS: "Enhanced UK teletext moves towards still pictures" * Page 527, right-hand column, lines 29-45 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-04-1986	VERSCHELDEN J.

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